Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

CERTAIN SHELL HEAPS OF THE ST. JOHN'S RIVER, FLORIDA, HITHERTO UNEXPLORED.

By Clarence Bloomfield Moore.

(*Continued from February Number, 1893.*)

(*Third Paper.*)

TICK ISLAND (VOLUSIA COUNTY).

Tick Island can be reached by entering Lake Dexter at its union with the St. John's (see map with the first paper of this series), and continuing across it and along Spring Garden Creek, a distance of about four miles in all, until a landing is reached on the southern side of the creek. The island was entirely unknown in connection with scientific research until visited by the writer in February, March and April, 1891. Other visits were made in January, 1892, January and March, 1893; in all twenty-two days have been devoted to the shell heaps and burial mound on Tick Island, with a large party of assistants; but so interesting is the place, and so extended the remains left by a race now passed from sight that much still awaits a thorough investigation.

In connection with many acres of shell deposit is an interesting burial mound of sand, described by the writer in the American Naturalist, issues of February and July, 1892. Thirty feet south of the great burial mound is a small mound, six feet in height and 180 feet in circumference, composed of fragments of shell mingled with sand, so closely packed that a pick is necessary for the work of excavation. The mound is covered with palmettoes whose roots, closely intertwined, lend an additional difficulty to the work of the explorer. As to the nature of this mound the writer is undecided.

Somewhat over 100 yards distant from the great burial mound in a northeasterly direction is a crescentic, or rather a bean-shaped, shell heap 573 feet in length, with a maximum breadth of base of 233 feet. The height is somewhat irregular, averaging about eight feet from the surrounding level, though the shell deposit is found sunk deep into the marshy soil. Excavations at various points yielded nothing of interest.

SHELL RIDGES, TICK ISLAND.

About a quarter of a mile south of the bean-shaped shell heap lie acres of shell ridges inadequately investigated by the writer. Upon one of these ridges are the remnants of a live oak, now destroyed by fire, but growing at the time of the writer's first visit and then measured by him. Taken at a point five feet from the base the circumference was sixteen feet or twenty-three feet, three feet from the base over projecting knots. At a distance of twelve feet from the trunk of this tree an excavation, 7 ft. by 4 ft., converging to a depth of 9 ft., was made. After 1 ft. 6 in. of humus, shell was reached. From the start fragments of pottery were found in great abundance, the ornamented outnumbering the plain. It was rude and thick in character, made from clay through which vegetable fibre, destroyed in the process of baking, had left minute canals. To overcome a too porous character, it had been, previous to baking, thinly coated with clay on the outside. The clay contained no admixture of pounded shell or of gravel, which is rarely if ever met with in the shell heaps of the St. John's. The manner of ornamentation mainly consisted of straight lines in various combinations as shown. Many pieces in addition had indentations in connection with lines, as figured by Wyman; while the marking of others consisted of series of concentric circles of increasing size.

At a depth of 7 ft. 6 in.—a depth sufficient to clearly prove its contemporary origin with the shell heap—was found a fragment of ornamented pottery, with a turned lip,[1] the only specimen of the sort ever met with by the writer in a shell heap of the St. John's (Fig. 1). Professor Wyman says ("Fresh Water Shell Mounds of the St. John's River, Florida," page, 53): "the mouth of the vase is generally flaring, is seldom contracted; we have seen no instance in which there were signs of a neck, and only one in which there was anything like a turned lip. This was from Bartram's Mound, and was found on the surface where it had been thrown out in digging up an orange tree. The depth of the hole from which it came was such that it must have been superficial, and may have been brought there by the more recent inhabitants. This view is confirmed by the fact that the stamped ornaments were of a different pattern from anything found elsewhere in the mounds, consisting of a series of short parallel ridges instead of squares." Bartram's Mound, or Little Orange Mound, is on the west side of the St. John's, opposite the entrance of Lake Dexter, and is not over five miles distant from Tick Island.

---

[1] By "lip" the writer means a turning out at one point of the upper margin through which fluid may pass, and not a turned rim encircling the pot. Such turned rims are by no means uncommon. It is taken for granted that Professor Wyman meant to express the same idea in the use of the word "lip."

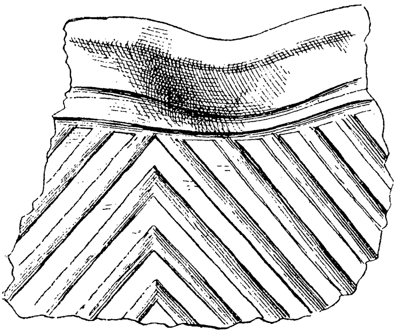
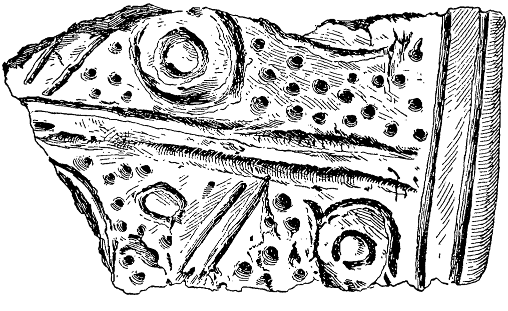


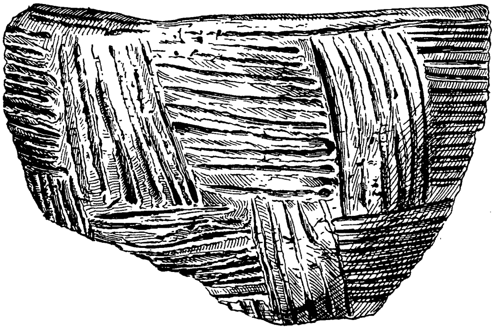
Fig. 1.
Lipped pottery, Tick Island. (Actual size.)

A number of other excavations, some of larger size, yielded abundant sherds of like quality and pattern. Tick Island and Orange Mound, to which reference will be made later, are



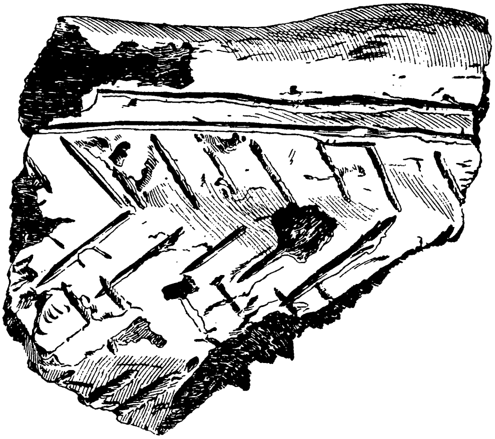
Sherd, Tick Island. (Actual size.)

richer by far in number of sherds and in variety of pattern than any other shell heaps of the St. John's explored by the



Sherd, Tick Island. (½ size.)

writer who, it may be said, has not confined himself to localities hitherto unexplored, but has carefully gone over those previously described by Professor Wyman, and has (January,

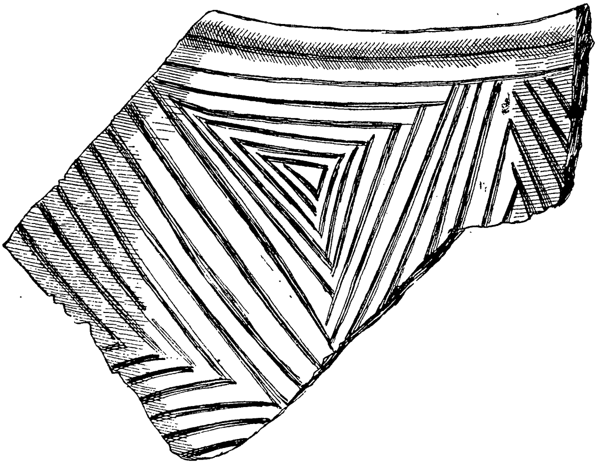


Sherd, Tick Island. (Actual size.)

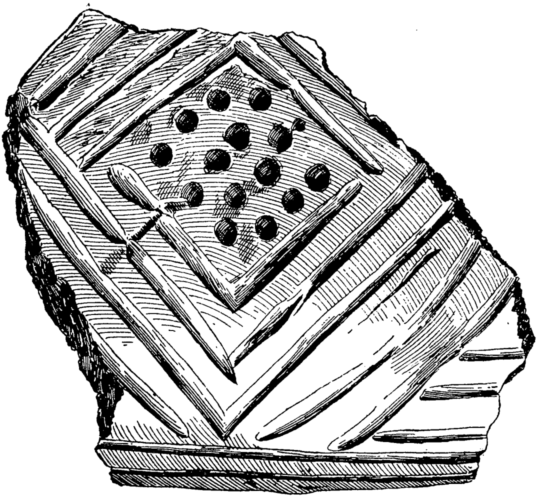
February, March, April, 1893) extensively explored others previously unreported not included in the list given with the first paper of this series.

SHELL HEAP NEAR ECONLOCKHATCHEE CREEK (ORANGE COUNTY).

In the prairie about two miles south of Lake Harney, and nearly a mile distant from the west bank of the St. John's, is a large shell heap covered with palmetto, oak, mulberry and other trees, from many of which hang trailing vines. It looms like an island in the prairie which in wet weather becomes a marsh. By ascending the winding Econlock-

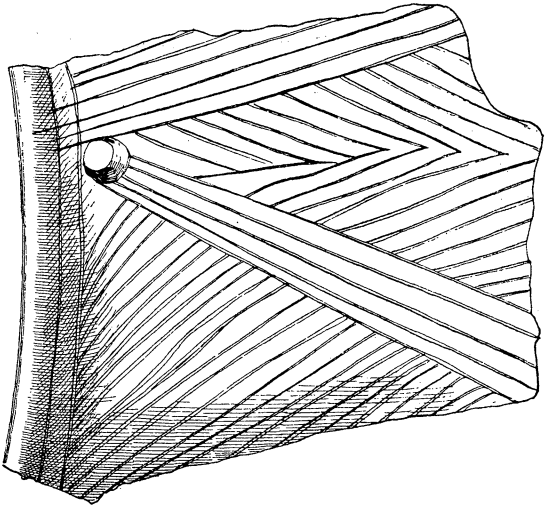


Sherd, Tick Island. (3/8 size.)

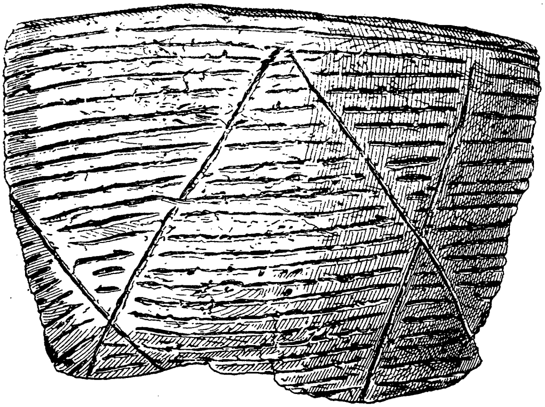


Sherd, Tick Island. (Actual size.)

hatchee, it is possible to tie up within three hundred yards of the shell heap. Its maximum height is about six feet near the center, from which point it slopes in every direction toward the surrounding prairie.



Sherd, Tick Island. (Actual size.)



Sherd, Tick Island. (½ size.)

Excavation I.

At the apex of the mound a hole, slightly converging, 6 ft. by 4 ft. by 7 ft. deep, was dug. Beginning at a level one foot from the surface and continuing through a layer two feet in thickness, were numerous human bones. These bones were broken into fragments and lay at random throughout the entire stratum. Some were found immediately upon a fire-place, and at least one of these human bones showed marks of fire. They were treated in respect to breakage as were the bones of lower animals found with them, and the areas of fracture were of the same dark brown color as the rest of the bone. The bones were so scattered that any estimate as to the number of bodies represented would be impossible, but fragments of at least four crania were met with. Few fragments of bone were in condition for measurement. The average lateral diameter of three portions of tibiæ was 59.9% of the average antero-posterior diameter. As stated in previous papers, these measurements were taken just where the nutrient artery enters the bone. Of three humeri one was perforated.

Composition of the Mound at Point of Excavation.

(*a*) 1 ft.—Sand and powdered shell, containing pottery, plain and ornamented, with fragments of bones of edible animals.

(*b*) 2 ft.—Sand, powdered shell and a slight admixture of shells. Numerous fragments of human bones were found throughout this layer, in association with fragments of animal bones, among which was half the lower jaw of a dog and faeces of animals. At the bottom of this layer, though not covering the entire area, was a fire-place. Absolutely no pottery in this stratum.

(*c*) 1 ft. 6 in.—Ampullariæ, paludinæ and uniones, with slight admixture of sand. No pottery and no bones of animals.

(*d*) 2 ft. 6 in.—Mixture of sand and shell. No remains of any sort.

In the upper layer were found a small piece of chipped chert, a fragment of a rude implement of bone and a rude disc of shell, rough at the margin and perforated in the center, having a diameter of 1¼ inches and a thickness of ¼ inch.

In the Report of the Bureau of Ethnology, 1880–1881, Plate XXVII, fig. 2, an almost exact counterpart of this shell disc is given, with the exception that the perforation is larger and irregular. It is described as one of the stages in the manufacture of shell fish-hooks by the Indians of California; but as fish-hooks of any material are not found in the mounds of the St. John's this disc may be considered a discoidal bead.

A second excavation on the east side of the mound showed, as before, pottery in the upper layer and none in those below. Six fragments of bone were met with, of which two were human.

In this shell heap the hypothesis of burials, even of disconnected bones, would seem untenable, as absolutely nothing found in association with them pointed to interments. A portion of the remains of this probably cannibalistic feast can be seen at the Wagner Free Institute, Philadelphia.

The finding of a bone belonging to the dog is entirely novel in the shell heaps of the St. John's. Professor Wyman's searches yielded no canine remains[2] nor has the writer hitherto upon any other occasion found, to the best of his knowledge, any portion of the skeleton of the dog in the river mounds. Wyman was aware of no evidence to show the presence of domestic dogs on the river in early times,[3] and cites Le Moyne's list of animals supposed to have been seen by the French[4] (1565), from which the dog is omitted. On the other hand, Cabeça de Vaca, Treasurer of the expedition of Pamphilo de Narvaez (1527), found dogs[5] among the natives during his wanderings along the coast of northwestern Florida, and in other portions of his journey. He makes no comment as to their origin, as he doubtless would have done had they been pointed out as curiosities, and it is hardly reasonable to suppose that, at so early a period, their derivation can have been from a European source. The bones of dogs are reported from a shell heap at Tampa.[6] The writer learns how-

[2] "Fresh Water Shell Mounds of the St. John's River, Florida," page 80.

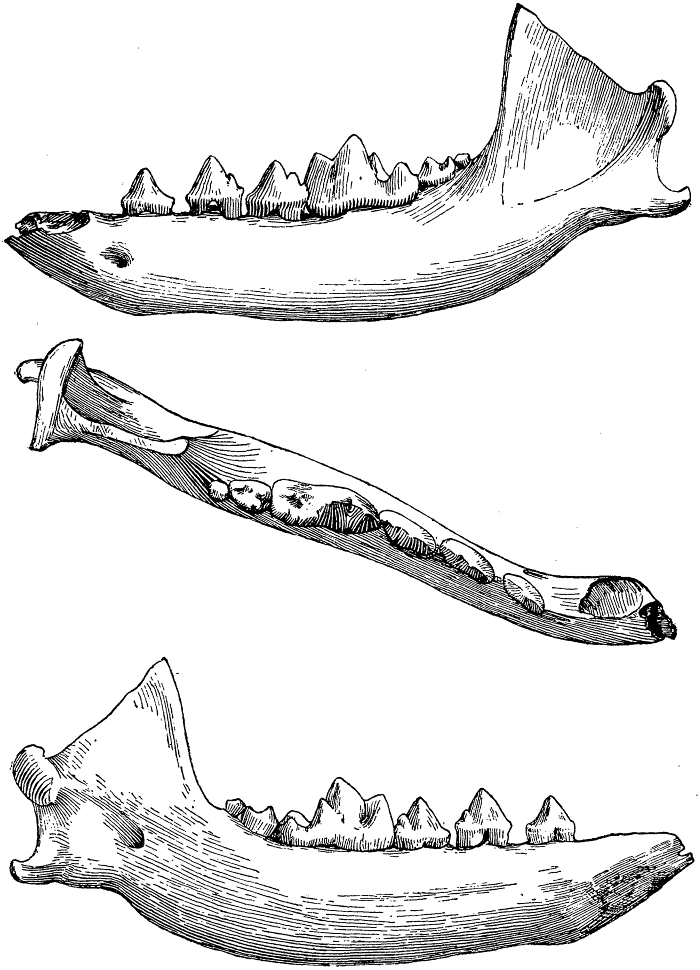
[3] Loc. cit.

[4] Loc. cit.

[5] "The Narrative of Alvar Nunez Cabeça de Vaca," translated by Buckingham Smith, Washington, 1851, page 41, et al.

[6] "Tampa Sunland and Tribune," Nov. 18, 1876.

ever that this discovery was superficial. De Soto, who landed at Tampa, had numerous fierce dogs, and found great quantities of dogs among the Indians of Georgia. Bones supposed to be of the dog are in the stone graves of Tennessee.[7]



Lower jaw of dog from Florida Shell Heap, $\frac{3}{4}$.

Dr. Dall regards it as presumable that the coyote has been domesticated along our southern border from time immemorial, though perhaps as an occasional curiosity in many tribes, rather than a usual companion. During nine years exploration he found one dog's skull in an Aleutian shell heap, a prehistoric deposit, and only one.[8]

---

[7] Dr. Joseph Jones, "Antiquities of Tennessee," page 9.

The dog has never yet been found fossil in Florida, though the fossil fauna of the state would suggest its presence.[9]

In view of the fact that but a single fragment of a canine skeleton has been found on the river, and that specimen at no great distance from the surface, it may be well, before arriving at any definite conclusion, to await a farther investigation.

Professor Cope has prepared the following note.

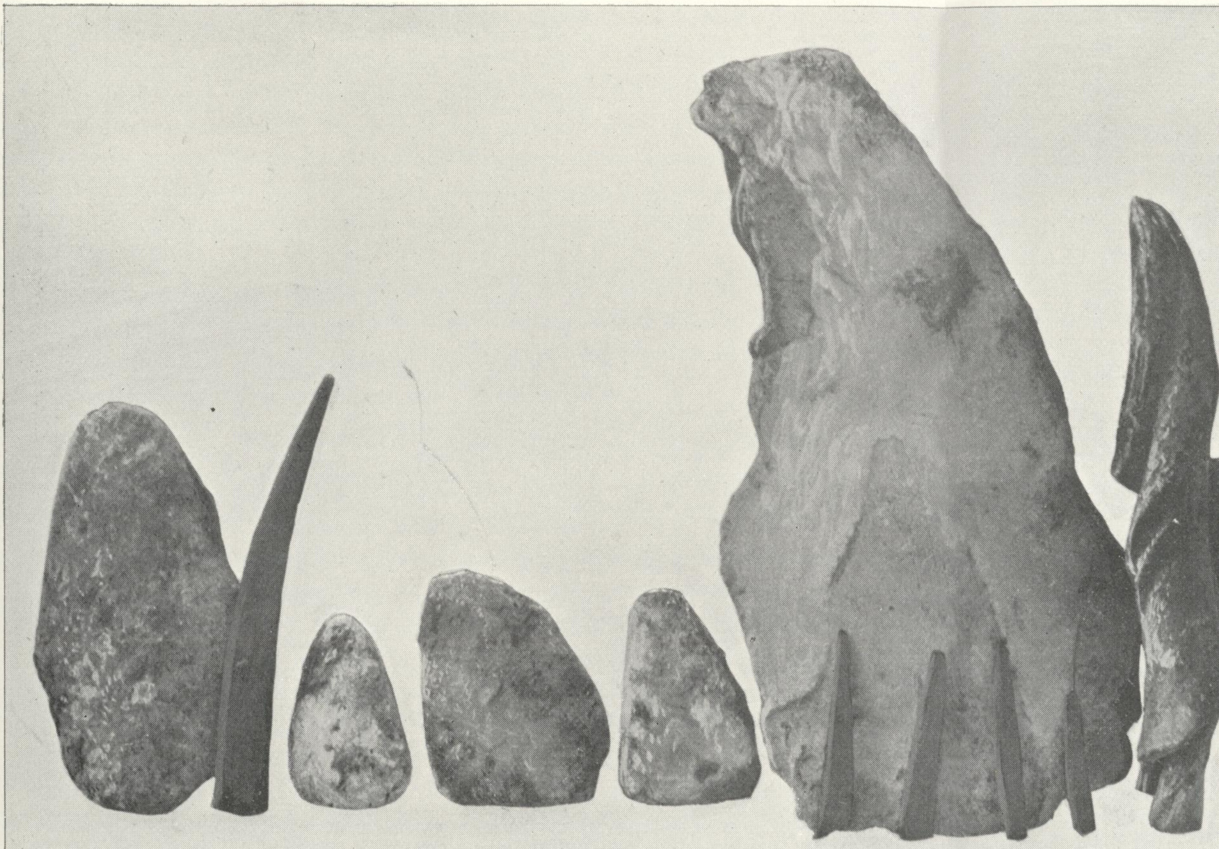
"The lower jaw of the dog found by Mr. Moore presents a number of peculiarities. In the first place, its proportions are not those of either the wolf or coyote. In the next place, the fourth premolar is absent and the short diastema which occupies its place is so much shorter than that which would result were the tooth lost from the jaw of most species and varieties of Canis, that it looks as if the absence were normal to the animal, as in the genus Tomarctus. This tooth is sometimes wanting in some domesticated dogs, but the deficiency occurs in dogs with convex foreheads, which are the product of much civilization. In the third place, the metaconid is larger than in the wolf or coyote, and the domesticated dogs generally. Finally the heel of the sectorial is peculiar. The entoconid is more conic than usual, and such crest as it develops does not form the outer wall of the heel, but is directed more inwardly than usual.

These peculiarities are remarkable, and render it desirable that more specimens should be obtained. The jaw is not referable to any domesticated species or race with which I have compared it. I, however, have not seen the skull and dentition of the Spanish terrier, which, from its appearance, I should suppose to have originated from an African jackal allied to *Canis mesomelas,* and to have been probably introduced into Spain by the Moors. Some of these dogs may have been introduced into Florida by the Spainards.—E. D. COPE."

---

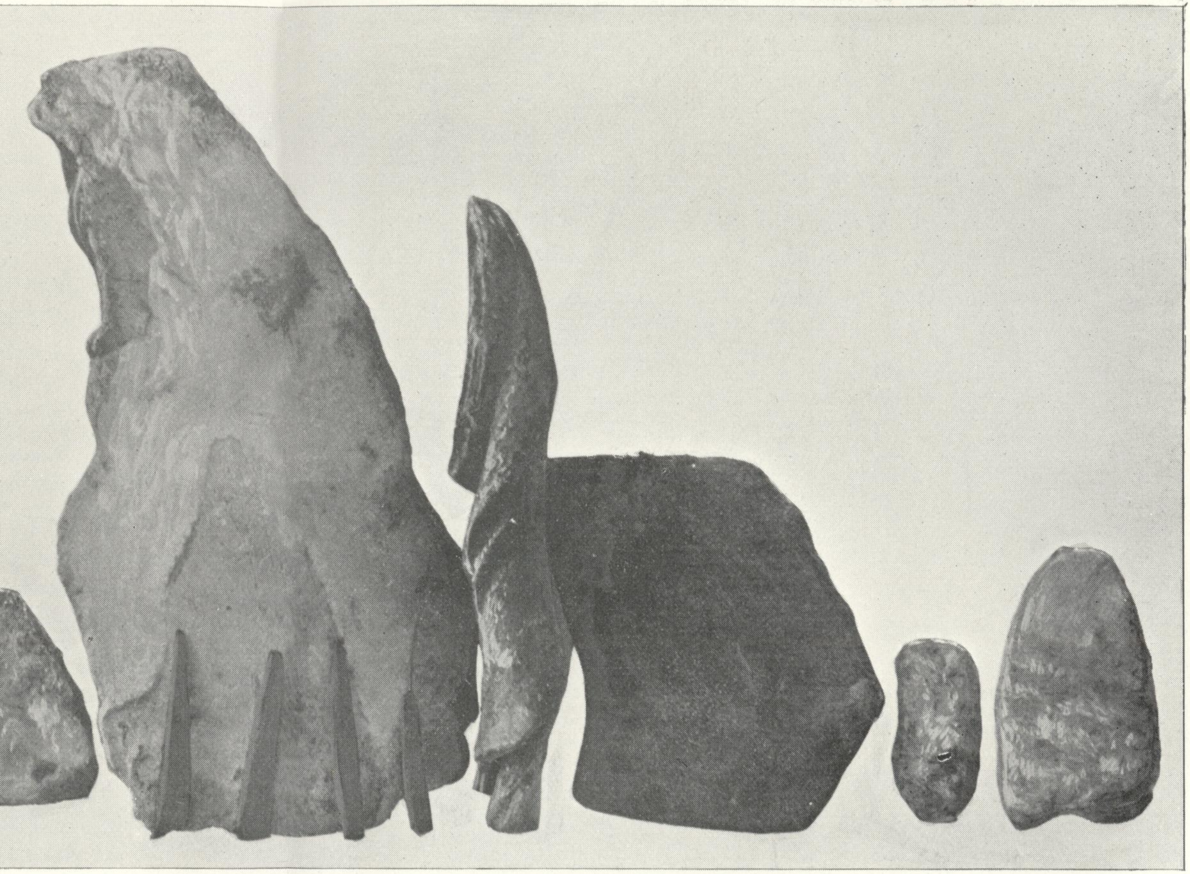
[8] Dr. W. H. Dall, private letter.

[9] Cope.



Cache, Long Bluff.

PLATE XVI.



Cache, Long Bluff.

ORANGE MOUND (ORANGE COUNTY).

This interesting mound is reached by turning to the west from the river into a lagoon, and continuing about 500 yards after leaving the channel. In a straight line it is ten miles south of Lake Harney, but so devious is the river that three times that number probably would not be an overestimate of the distance by boat, by which means alone can access to the mound be had. Le Baron (Smithsonian Report, 1882, page 102) refers to Orange Mound. He made no investigations and puts the height at forty feet; probably a misprint for fourteen, its maximum altitude. His other dimensions are likewise faulty.

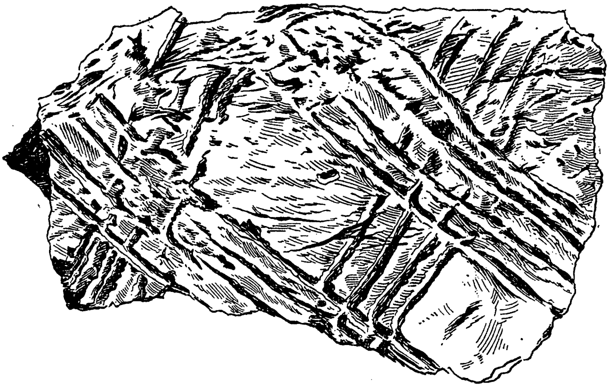
The mound, crescentic in shape, lies north and south. Its length, following the ridge of the crescent, is 560 feet; its maximum width 260 feet. It slopes on every side toward the water and offers usually a secure retreat for numerous large hard-shell turtles which visit it to deposit their eggs. By cutting off their escape to the water, the crew of the writer's boat in one morning secured five, and doubtless the aborigines in the same manner obtained this staple article of diet.

The mound has been under cultivation for the growth of cane, and a tumble-down shed, where once an old caldron stood, is very picturesque, shadowed by towering palmettoes and flanked by a tropical growth of bananas.

Surface pottery is abundant, both plain and stamped in squares. It is of fairly good quality and probably has no connection with the builders of the shell heap. Orange Mound was visited by the writer a number of times during the winter of 1891 and photographs secured; but February 7, 8, 9, 1892 and two days of the winter of 1893 were devoted to serious excavations.

Excavation I.

About the center of the mound at its highest point, 12½ ft. by 8 ft. by 15 ft. deep, converging. The first foot was through a layer of loam filled with pottery of the variety seen on the surface. At a depth of one foot was found a shell chisel, small and perfect. The next three feet consisted of ampullariæ loosely thrown together, with a slight admixture of sand. Many of these shells were of extraordinary size, among them being found specimens far surpassing all previous records known to science. At a depth of 1½ ft. were clearly defined traces of a fire-place. Through the layer of ampullariæ and in the succeeding stratum, consisting of one foot of brown sand, mingled with ampullariæ, unionidæ and paludinæ, pottery was abundant, thick and coarse in character, with a certain percentage decorated with lines.



Sherd, Orange Mound. (Actual size.)

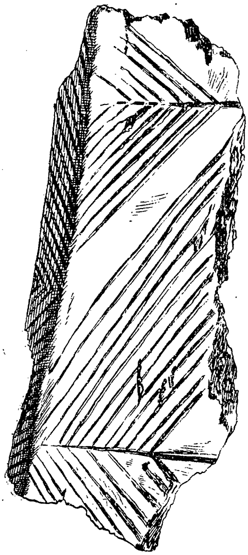


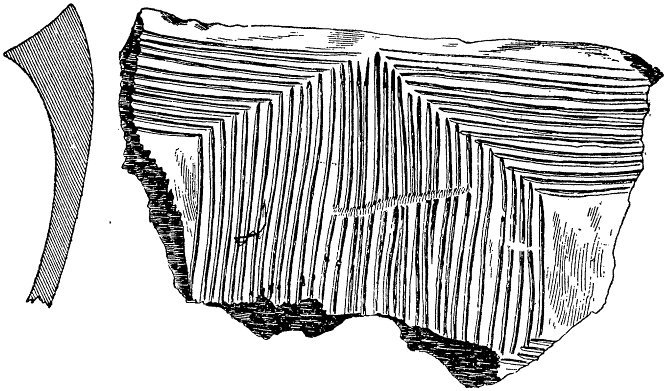
Fig. 2.
Orange Mound. (½ size.)

In its method of manufacture, namely, the admixture with the clay of vegetable fibre, which subsequent heat had destroyed, leaving the material porous in character, it resembled the pottery of the shell ridges at Tick Island and of some other deposits of the river, some sherds being so much as .7 inch in thickness. The patterns varied considerably as to the arrangement of lines, and in certain ones decorations appeared on the upper margin of the rim (Fig. 2).

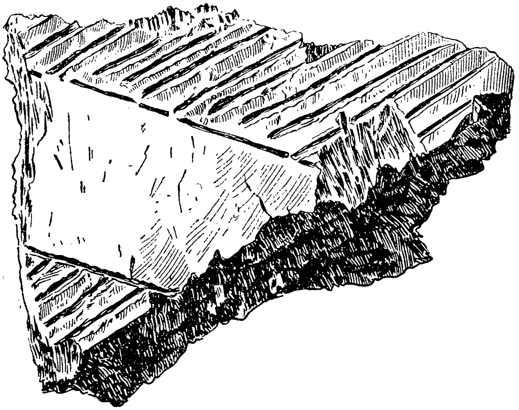
Some fragments with inverted rim were

thickest at the top, the general thickness being .6 inch, thickness of rim 1.2 inches.

At a depth greater than five feet not a fragment of pottery was encountered. Fire-places were found at varying depths, while throughout the entire excavation bones of the turtle, deer, alligator and other edible animals were met with. At a depth of 4½ feet, in a layer of brown sand, with a percentage of shell intermingled, strongly reminding the writer of the brown sand layer in the Tick Island burial mound,[10] a num-



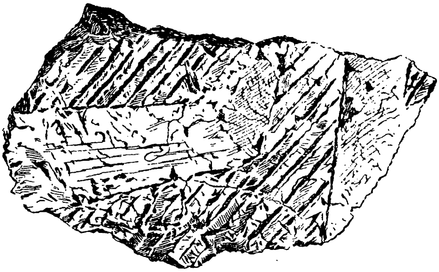
Sherd, Orange Mound. (½ size.)



Sherd, Orange Mound. (Actual size.)

[10] American Naturalist, February and July, 1892.

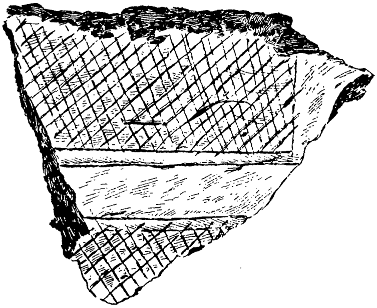
ber of human bones were encountered. They were somewhat disturbed by the digging but were neither crushed nor broken as are the bones of the shell heaps, and it was evident that interments had taken place. Below the bones was a layer of pure white sand, so common in the burial mounds. This stratum seemed to a great extent to be local, being 1½ feet through at the thickest part, namely, the northwest part of the excavation, diminishing on the east and west and being entirely lost on the south. Further investigations showed the white sand layer to decrease in thickness to the north, being but four inches thick at a distance of three feet beyond the excavation.



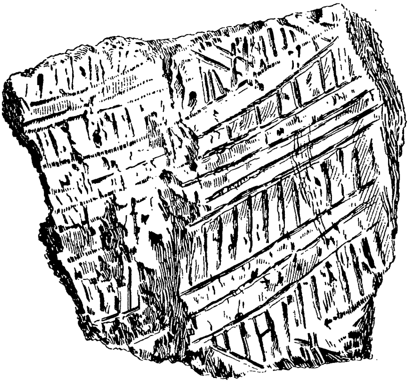
Sherd, Orange Mound. (½ size.)

By digging with trowels into the south side of the excavation, in a layer of almost pure brown sand was found the skeleton of a woman, buried at length in a horizontal position in perfect anatomical order. The skeleton as it lay measured 5 feet, 1½ inches in length. The position of the skull was 10° south of west, the feet pointing 10° north of east. The forearm lay across the pelvis. The body had been buried upon its left side and the left leg and arm were missing. It is almost certain, in view of the presence of every other bone of the skeleton, that these members, extending somewhat from the body, unlike the right arm and leg, were thrown out by the spades prior to troweling into the side of the excavation. The skull was somewhat crushed. The femur was 14½ inches in length (tape); the humerus was not perforated. The tibia in lateral diameter was 58.2% of the fore and aft diameter, showing decided platycnemism.

About one foot south of this burial on a line with the ribs was found what was probably a burial of the kind so well known in some of the sand mounds of the river and of the coast, where the body, previously exposed to the elements, is denuded of flesh before burial. As a rule, the larger bones are placed in a bundle horizontally and are surmounted by the skull. In this case the cranium lay below the bones. Above it in immediate association were the larger bones of the body. The lower jaw lay about six inches from the upper jaw to one side with the teeth turned away. A few vertebræ were beneath the head, while two heel bones were with the bundle. Upright by the skull was a femur belonging to another body. All these bones were badly decayed



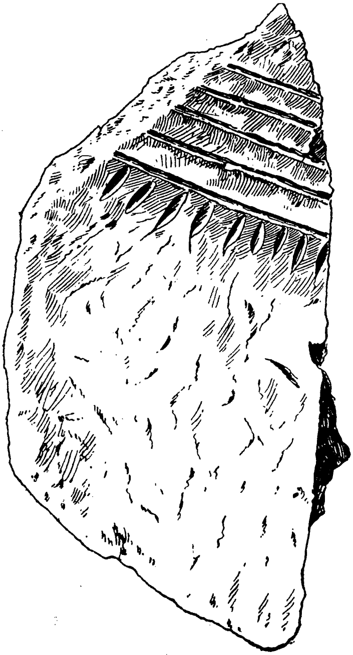
Sherd, Orange Mound. (½ size.)



Sherd, Orange Mound. (½ size.)

being in a far worse condition than those of the skeleton at length.

To return to the main excavation. Below the layer of white sand were two feet of brown sand and shell intermingled, and beneath this was a stratum 2 feet 9 inches in depth composed of crushed shells with a very slight admixture of sand. At a depth of 8 feet were more human bones disarranged by the digging. At a depth of 8½ feet a cranium was found, with bones of the face missing, except a half of the lower jaw. In association were bones of the lower animals. At the same level as the skull, and where they might be looked for, in anatomical order were pelvis, femur, tibia, fibula and foot bones complete. A femur lay somewhat apart. It is possible that this femur, not in association with the pelvis or with the tibia which was found lying across the first tibia in anatomical order, may have been separated from the skeleton by the shifting of sand caused by trampling in earlier stages of the



Sherd, Orange Mound. (Actual size.)

mound.[11] Between the skull and pelvis lay decaying fragments of ribs. It is probable that the missing arm bones extending upward were those inadvertently disarranged by digging half a foot above.

At a depth of 8½ feet immediately below the bones was a layer two feet, nine inches in thickness, consisting of the ordinary crushed shell of the shell heaps, with fire-places, bones of the lower animals, etc., as ordinarily found. Nothing of further interest was met with.

Diagram of the northern side of this excavation is appended.

A number of other excavations were made in various portions of the mound. No pottery was met with below 5½ feet anywhere near the center of the mound, though near the margin—probably a later deposit—pieces were found at a depth of seven feet. Eighty-eight feet from the first excavation on the northern slope of the mound seven feet below the surface was found a portion of a rude spear head of red chalcedony, 1½ inches in length. In this excavation the glandina truncata was comparatively numerous, some thirty or fourty specimens being present. This land shell is of infrequent occurrence in the mounds.

Of the four humeri found during the first excavation not one was perforated. The three tibiæ exhumed in a condition for measurement had an average of 58.0 per cent lateral diameter as compared to the antero-posterior diameter. No crania were saved.

To those interested in the archæology of Florida, the result of the investigation conducted at Orange Mound must be regarded as of considerable importance. It will be remembered that to the present time no conclusive evidence has been secured, assigning to any sand mounds of the river an origin contemporary with the shell-heaps. That burials took place at Orange Mound in a regular stratified mound of sand is beyond the shadow of a doubt, and that the burial mound was not made upon an abandoned shell-heap, perhaps long

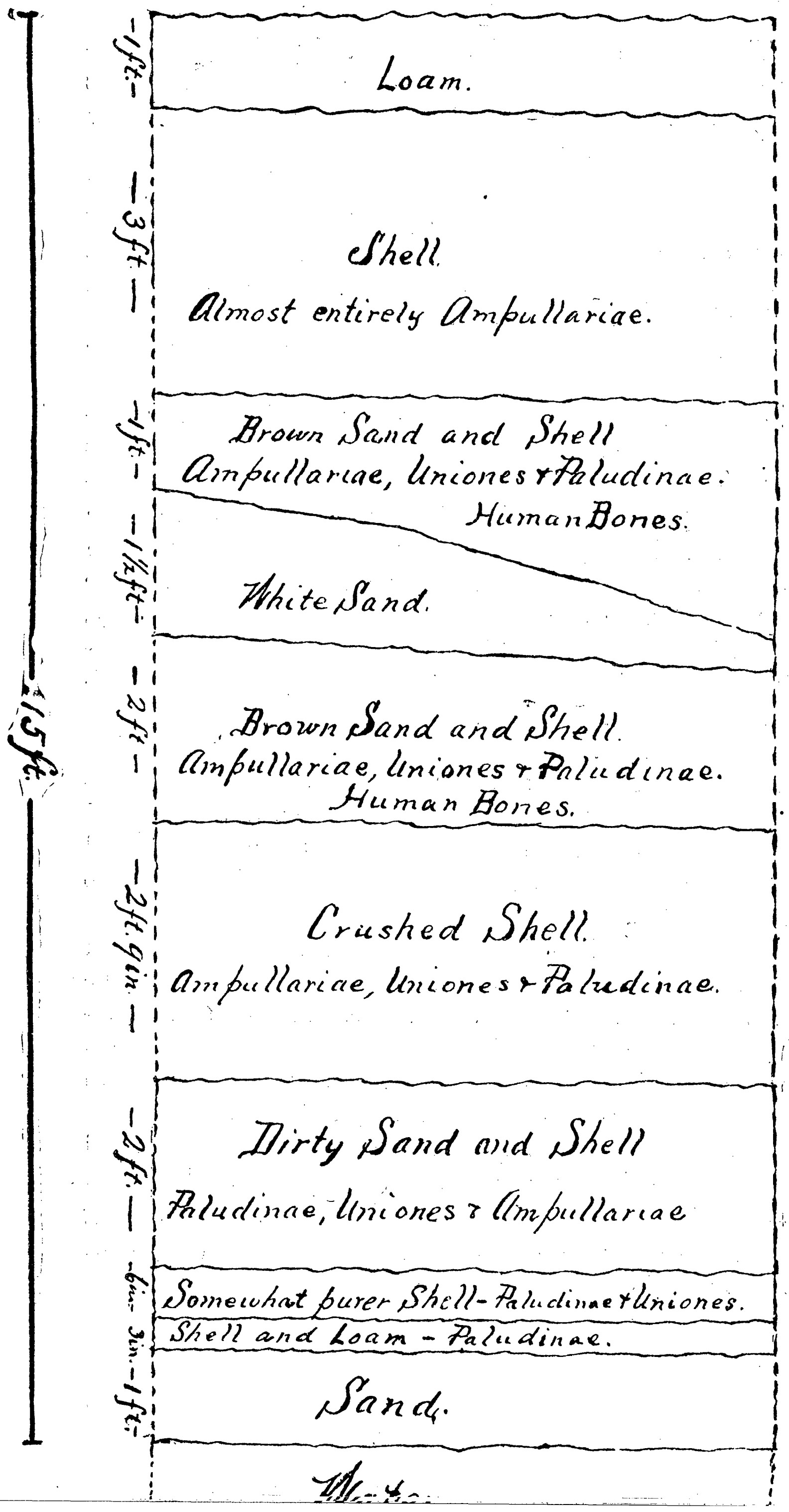
---

[11] This shifting of bones is not uncommon according to Topinard, Revue d'Anthropologie, 1886, page 742.

Section of North Side of Excavation.

Orange Mound, Fla.

Scale - ½" = 1'.


15 ft.
1 ft.
Loam.
3 ft.
Shell.
Almost entirely Ampullariae.
1 ft.
Brown Sand and Shell
Ampullariae, Uniones & Paludinae.
Human Bones.
1½ ft.
White Sand.
2 ft.
Brown Sand and Shell.
Ampullariae, Uniones & Paludinae.
Human Bones.
2 ft. 9 in.
Crushed Shell.
Ampullariae, Uniones & Paludinae.
2 ft.
Dirty Sand and Shell
Paludinae, Uniones & Ampullariae
6 in.
Somewhat purer Shell - Paludinae & Uniones.
3 in.
Shell and Loam - Paludinae.
1 ft.
Sand.
Wat

after the eaters of shell-fish had passed away, is irrefutably shown by the three feet of ampullariæ piled above. It must therefore be admitted that the aborigines of the shell heaps, in one instance at least, interred their dead in a sand mound in every respect similar to many burial mounds of the St. John's, and the writer considers it so unlikely that the stratified burial mound met with in the center of the great shell-heap at Orange Mound is an isolated case in respect to the method of sepulture of the eaters of shell-fish that at least the erection of some of the sand mounds of the river by the men who piled up the shell-heaps would seem to be strongly indicated.

LONG BLUFF (ORANGE COUNTY).

This bluff on the west bank of the St. John's lies directly on the water's edge. It is separated from a large shell-hammock by a quarter of a mile of marsh. This southerly portion probably is considered a part of the Bluff, or at all events has no distinctive name. Long Bluff, unlike most of the shell-deposits south of Lake Harney, is not composed entirely of shell and does not appear to owe its origin solely to the debris of the meals of the aborigines, but consists of sand through which is a sprinkling of shells. It is perfectly level and if cleared of the dense mass of palmettoes which shade it, would be termed a shell-field.

A Cache.

About midway in the northern portion of the Bluff an excavation, the point for which was selected at random, was made, 1½ feet through the sandy loam, with here and there an occasional shell. Beneath was a hard conglomerate of sand and shell, mostly uniones, about four inches in thickness, necessitating the use of the pick. Underneath the shell layer was a pure white sand, continuing to water level. At a depth of eight inches in this sand, or 2½ feet beneath the surface, by good fortune, was found what was probably a cache of one of the earlier Indians. In a space no larger than a man's hat, in actual contact, lay six chisels or scrapers of shell, each of a different size, 8 inches, 4¼ inches, 3 inches, 2¼ inches, 2 inches, 1¾ inches, in length, respectively; one shell gouge; one spiral instrument for cutting or polishing, 6½ inches in length, made from the columella of the fasciolaria; four bone awls; one curved awl of bone, 4 inches in length; one sandstone hone or whetstone; a large number of the smaller bones of edible animals. (See Plate XVI.)

In order to ascertain whether these relics marked the site of a burial, the excavation was continued until a trench, 15 ft. by 4 ft., 3 in. by 3 ft. to 4 ft. deep, was dug. At a depth of 8 inches from the surface an arrow head was found, and during the course of the digging another hone, an oyster shell and several pieces of lined pottery were met with. There were, however, absolutely no indications of a burial. The chisels were perfect, with one exception, the hone showed no marks of use, and the points of the awls were intact. These relics therefore, are not the debris of the shell heaps, and their number precludes the possibility of an unintentional deposit. With no human bones in association, a cache would seem to be indicated, although the presence of unworked animal bones—unless to serve as material for implements—is difficult to explain.

In the southern portion of the Bluff a number of small excavations were made. Fragments of human bone, with broken bones of edible lower animals were met with.